Reference Manual
00809-0100-4708, Rev AD
September 2012

Rosemount 708 Wireless Acoustic Transmitter

IEC

WirelessHART

ROSEMOUNT®

www.rosemount.com

EMERSON™
Process Management

Rosemount 708 Wireless Acoustic Transmitter

Rosemount 708 Hardware Revision	**1**
HART® Device Revision	**1**
Field Communicator Field Device Revision	**Dev v1, DD v1**

NOTICE

Read this manual before working with the product. For personal and system safety, and for optimum product performance, make sure to thoroughly understand the contents before installing, using, or maintaining this product.

The United States has two toll-free assistance numbers and one international number.

Customer Central
1 800 999 9307 (7:00 a.m. to 7:00 p.m. CST)

National Response Center
1 800 654 7768 (24 hours a day)
Equipment service needs

International
1 952 906 8888

⚠CAUTION

The products described in this document are NOT designed for nuclear-qualified applications.

Using non-nuclear qualified products in applications that require nuclear-qualified hardware or products may cause inaccurate readings.

For information on Rosemount nuclear-qualified products, contact an Emerson Process Management Sales Representative.

⚠WARNING

Explosions could result in death or serious injury:

Installation of this transmitter in an explosive environment must be in accordance with the appropriate local, national, and international standards, codes, and practices. Please review the Product Certifications section for any restrictions associated with a safe installation.

- Before connecting a Field Communicator in an explosive atmosphere, ensure the instruments are installed in accordance with intrinsically safe field wiring practices.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following conditions. This device may not cause harmful interference. This device must accept any interference received, including interference that may cause undesired operation.

This device must be installed to ensure a minimum antenna separation distance of 20 cm (8 in.) from all persons.

The Power Module may be replaced in a hazardous area. The Power Module has surface resistivity greater than one gigaohm and must be properly installed in the wireless device enclosure. Care must be taken during transportation to and from the point of installation to prevent a potential electrostatic charging hazard.

Polymer enclosure has surface resistivity greater than one gigaohm. Care must be taken during transportation to and from the point of installation to prevent a potential electrostatic charging hazard.

NOTICE

The Rosemount 708 and all other wireless devices should be installed only after the Smart Wireless Gateway has been installed and is functioning properly. Wireless devices should also be powered up in order of proximity from the Smart Wireless Gateway, beginning with the closest. This will result in a simpler and faster network installation.

NOTICE

Shipping considerations for wireless products:

The unit was shipped to you without the power module installed. Please remove the power module prior to shipping.

Each power module contains one “D” size primary lithium battery. Primary lithium batteries are regulated in transportation by the U. S. Department of Transportation, and are also covered by IATA (International Air Transport Association), ICAO (International Civil Aviation Organization), and ARD (European Ground Transportation of Dangerous Goods). It is the responsibility of the shipper to ensure compliance with these or any other local requirements. Please consult current regulations and requirements before shipping.

NOTICE

The power module with the wireless unit contains one “D” size primary lithium/thionyl chloride battery. Each battery contains approximately 5.0 grams of lithium. Under normal conditions, the battery materials are self-contained and are not reactive as long as the battery and the pack integrity are maintained. Care should be taken to prevent thermal, electrical or mechanical damage. Contacts should be protected to prevent premature discharge.

Battery hazards remain when cells are discharged.

Power modules should be stored in a clean and dry area. For maximum battery life, storage temperature should not exceed 30 °C (86 °F).

The Power Module may be replaced in a hazardous area. The Power Module has surface resistivity greater than one gigaohm and must be properly installed in the wireless device enclosure. Care must be taken during transportation to and from the point of installation to prevent electrostatic charge build-up.

Table of Contents

SECTION 1 Overview

Safety Messages 1-1
Warnings 1-1
Overview 1-2
708 Transmitter 1-2
Considerations 1-2
General 1-2
Wireless Considerations 1-3
Mechanical 1-4
Electrical 1-4
Environmental 1-4
Service Support 1-5
Product Recycling/Disposal 1-6

SECTION 2 Configuration

Safety Messages 2-1
Warnings 2-1
Device Configuration 2-1
Device Network Configuration 2-2
AMS 2-2
Field Communicator 2-2
Fast Key Sequence 2-3
Remove Power Module 2-3
HART Menu Tree 2-4

SECTION 3 Mounting

Safety Messages 3-1
Warnings 3-1
Mounting 3-1
Mounting Considerations 3-3

SECTION 4 Commissioning

Safety Messages 4-1
Warnings 4-1
Verify Operation 4-1
Field Communicator 4-2
Smart Wireless Gateway 4-2
Field Communicator Use 4-4

SECTION 5 Operation and Maintenance

Safety Messages 5-1
Warnings 5-1
Operation 5-1
Alerts 5-2
Device Alert Configuration 5-3
Power Module Replacement 5-5

SECTION 6 Troubleshooting

Overview 6-1
Safety Messages 6-1
Warnings 6-1

APPENDIX A Specifications and Reference Data

Specifications A-1
Functional Specifications A-1
Physical Specifications A-1
Performance Specifications A-2
Wireless Output Specifications A-2
Dimensional Drawings A-3
Ordering Information A-4

APPENDIX B Product Certifications

Approved Manufacturing Locations B-1
Telecommunication Compliance B-1
FCC and IC B-1
European Union Directive Information B-1
Ordinary Location Certification for FM B-1
Hazardous Locations Certificates B-2

APPENDIX C Recommended Practices

Effective Range C-1

Section 1 Overview

Safety Messages . . . . . page 1-1
Overview . . . . . page 1-2
Considerations . . . . . page 1-2
Service Support . . . . . page 1-5
Product Recycling/Disposal . . . . . page 1-6

SAFETY MESSAGES

Instructions and procedures in this section may require special precautions to ensure the safety of the personnel performing the operations. Information that potentially raises safety issues is indicated by a warning symbol (⚠). Please refer to the following safety messages before performing an operation preceded by this symbol.

Warnings

⚠WARNING

Explosions could result in death or serious injury:

Failure to follow these installation guidelines could result in death or serious injury:

- Only qualified personnel should perform the installation.

Installation of this transmitter in an explosive environment must be in accordance with the appropriate local, national, and international standards, codes, and practices. Please review the Product Certifications section for any restrictions associated with a safe installation.

- Before connecting a Field Communicator in an explosive atmosphere, ensure the instruments are installed in accordance with intrinsically safe

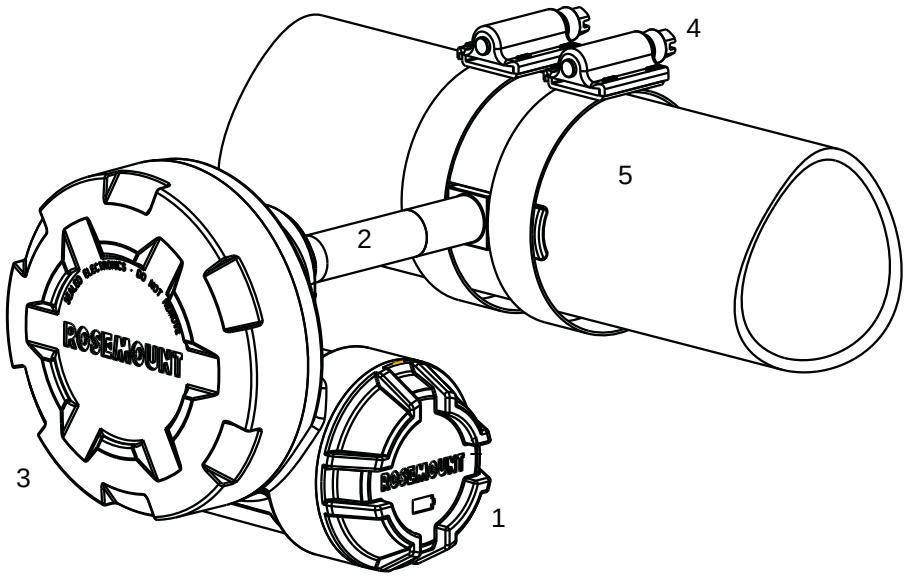
OVERVIEW

708 Transmitter

Benefits of the Rosemount 708 include:

- Improved energy efficiency and environmental compliance with acoustic monitoring of steam traps and pressure relief valves
- Gain instant visibility to all of your critical steam traps and PRVs through a non-intrusive, WirelessHART® monitoring system
- Know you are backed by Emerson's proven experience in Smart Wireless field instrumentation and expert technical support

Figure 1-1. Rosemount 708 Wireless Acoustic Transmitter Overview



1. Power Module cover – Location of Power Module in device. Unscrew cap for access to Power Module.
2. Waveguide – Location of the acoustic and temperature sensors.
3. Electronics cover – The cover is sealed and cannot be removed.
4. Stainless steel mounting bands – Used to connect the acoustic transmitter to the process piping.
5. Pipe - The acoustic transmitter is installed directly to the process pipe.

CONSIDERATIONS

General

The acoustic transmitter detects the presence of acoustic noise along with sensor temperature. The Rosemount 708 converts the acoustic and temperature measurements into output data and alerts.

Wireless Considerations

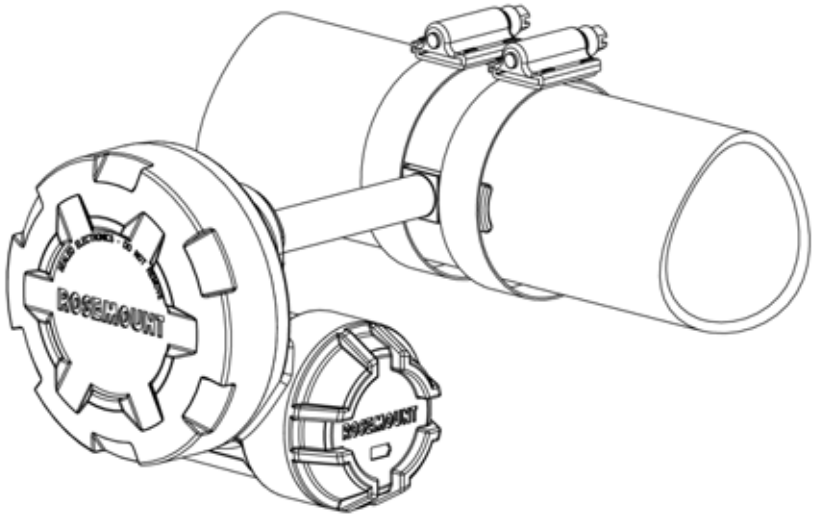
Power Up Sequence

The Smart Wireless Gateway (Gateway) should be installed and functioning properly before any wireless devices are powered. Install the power module, SmartPower Solutions, model number 701PGN green power module, into the 708 to power the device. This results in a simpler and faster network installation. Enabling Active Advertising on the Gateway ensures that new devices are able to join the network faster. For more information see the Smart Wireless Gateway Reference Manual (Document No. 00809-0200-4420).

Antenna Position

The antenna is internal to the acoustic transmitter. To achieve optimal range, orient the transmitter with the waveguide horizontal and the power module closest to the ground as shown in Figure 1-2. Good connectivity can also be achieved in other orientations. The antenna should also be approximately 1 m (3 ft.) from any large structure, building, or conductive surface to allow for clear communication to other devices. Refer to best practices for additional information on optimal mounting locations of device.

Figure 1-2. Antenna Position



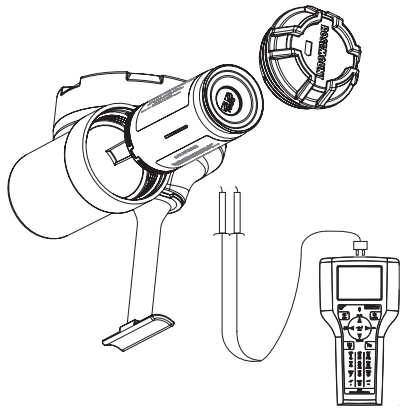
Recommended Practices

When mounting the device, recommended practices should be considered to achieve the best wireless performance. See Appendix C for more information on recommended practices.

Field Communicator Connections

The Power Module needs to be installed in the device for the Field Communicator to interface with the 708. This transmitter uses the Green Power Module; please order model number 701PGNKF. Field communication with this device requires a HART-based Field Communicator using the correct 708 DD. Field communicator connections are located on the power module. The Power Module is keyed and can only be inserted in one orientation. Refer to Figure 1-3 for instructions on connecting the Field Communicator to the 708.

Figure 1-3. Connection Diagram



Mechanical

Location

When choosing an installation location and position, take into account access to the power module compartment for easy power module replacement.

Electronics cover

The electronics cover is sealed and cannot be removed. Do not attempt to unscrew the cover.

Electrical

Power Module

The Rosemount 708 Wireless Acoustic Transmitter is self-powered. The power module contains one “D” size primary lithium/thionyl chloride battery. Each battery contains approximately 5.0 grams of lithium. Under normal conditions, the battery materials are self-contained and are not reactive as long as the battery and the power module are maintained. Care should be taken to prevent thermal, electrical, or mechanical damage. Contacts should be protected to prevent premature discharge.

⚠ Use caution when handling the power module, it may be damaged if dropped from heights in excess of 6.10 m (20 ft).

Environmental

Verify that the operating atmosphere of the transmitter is consistent with the appropriate hazardous locations certifications.

Temperature Effects

The transmitter will operate within specifications for ambient temperatures between -40 and 85 °C (-40 and 185 °F).

Heat from the process is transferred to the transmitter housing. If the process temperature is high, the ambient temperature will need to be lower to account for heat transferred to the transmitter housing. See Table 1-1 for process temperature derating.

Table 1-1. Temperature Derating

Process Temperature (°C)	Process Temperature (°F)	Max Ambient (°C)	Max Ambient (°F)
260	500	41	105.8
240	464	45	113
220	428	49	120.2
200	392	53	127.4
180	356	57	134.6
160	320	61	141.8
140	284	64	147.2
120	248	68	154.4
100	212	72	161.6
85	185	75	167

SERVICE SUPPORT

To expedite the return process outside of North America, contact your Emerson Process Management representative.

Within the United States, call the Emerson Process Management Response Center toll-free number 1 800 654 7768. The center, which is available 24 hours a day, will assist you with any needed information or materials.

The center will ask for product model and serial numbers, and will provide a Return Material Authorization (RMA) number. The center will also ask for the process material to which the product was last exposed.

⚠CAUTION

Individuals who handle products exposed to a hazardous substance can avoid injury if they are informed of, and understand, the hazard. If the product being returned was exposed to a hazardous substance as defined by OSHA, a copy of the required Material Safety Data Sheet (MSDS) for each hazardous substance identified must be included with the returned goods.

SHIPPING CONSIDERATIONS FOR WIRELESS PRODUCTS (LITHIUM BATTERIES):
The unit was shipped to you without the power module installed. Please remove the power module prior to shipping the unit.

Primary lithium batteries (charged or discharged) are regulated during transportation by the U.S. Department of Transportation. They are also covered by IATA (International Air Transport Association), ICAO (International Civil Aviation Organization), and ARD (European Ground Transportation of Dangerous Goods). It is the responsibility of the shipper to ensure compliance with these or any other local requirements. Consult current regulations and requirements before shipping.

PRODUCT RECYCLING/DISPOSAL

Recycling of equipment and packaging should be taken into consideration. The product and packaging should be disposed of in accordance with local and national legislation.

Section 2 Configuration

Safety Messages . . . . . page 2-1
Device Configuration . . . . . page 2-1
Device Network Configuration . . . . . page 2-2
Remove Power Module . . . . . page 2-3
HART Menu Tree . . . . . page 2-4

SAFETY MESSAGES

Instructions and procedures in this section may require special precautions to ensure the safety of the personnel performing the operations. Information that potentially raises safety issues is indicated by a warning symbol (⚠). Please refer to the following safety messages before performing an operation preceded by this symbol.

Warnings

⚠WARNING

Explosions could result in death or serious injury:

Installation of this transmitter in an explosive environment must be in accordance with the appropriate local, national, and international standards, codes, and practices. Please review the Product Certifications section for any restrictions associated with a safe installation.

- Before connecting a Field Communicator in an explosive atmosphere, ensure the instruments are installed in accordance with intrinsically safe wiring practices.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following conditions. This device may not cause harmful interference. This device must accept any interference received, including interference that may cause undesired operation.

This device must be installed to ensure a minimum antenna separation distance of 20 cm (8 in.) from all persons.

- The Power Module may be replaced in a hazardous area. The Power Module has surface resistivity greater than one gigaohm and must be properly installed in the wireless device enclosure. Care must be taken during transportation to and from the point of installation to prevent a potential electrostatic charging hazard.
  Polymer enclosure has surface resistivity greater than one gigaohm. Care must be taken during transportation to and from the point of installation to prevent a potential electrostatic charging hazard.

DEVICE CONFIGURATION

Remove the power module cover and connect to the HART communication terminals for configuration.

The Rosemount 708 will receive HART communication from a handheld 375/475 Field Communicator (Field Communicator) or AMS Wireless Configurator. When using a Field Communicator, any configuration changes must be sent to the transmitter using the **Send** key (F2). AMS Wireless Configurator configuration changes are implemented when the **Apply** button is clicked.

AMS® Wireless Configurator

AMS Wireless Configurator is capable of connecting to devices directly, using a HART modem, or remotely using the Gateway. To configure the Rosemount 708, double click (or right click and select Configure/Setup) on the device icon that will appear below either the HART modem or Gateway connection tree.

DEVICE NETWORK CONFIGURATION

In order to communicate with the Gateway, and ultimately the host system, the transmitter must be configured to communicate with the wireless network. Using a Field Communicator or AMS Wireless Configurator, enter the **Network ID and Join Key** so that they match the Network ID and Join Key of the Gateway and other devices in the network. If the network ID and join key are not the same as the Gateway, the acoustic transmitter will not communicate with the network. The Network ID and Join Key may be obtained from the Gateway on the **Setup>Network>Settings** page on the web server, shown in Figure 2-1.

Figure 2-1. Gateway Network Settings

AMS

Right click on the acoustic transmitter and select **Configure**. When the menu opens, select **Join Device to Network** and follow the method to enter the Network ID and Join Key.

Field Communicator

The Network ID and Join Key may be changed in the wireless device by using the following Fast Key sequence. Set both Network ID and Join Key.

Function	Key Sequence	Menu Items
Join Device to Network	2, 1, 2	Network ID, Set Join Key

Fast Key Sequence

Table 2-1 lists the fast key sequence for common transmitter functions.

Table 2-1. 708 Fast Key Sequence

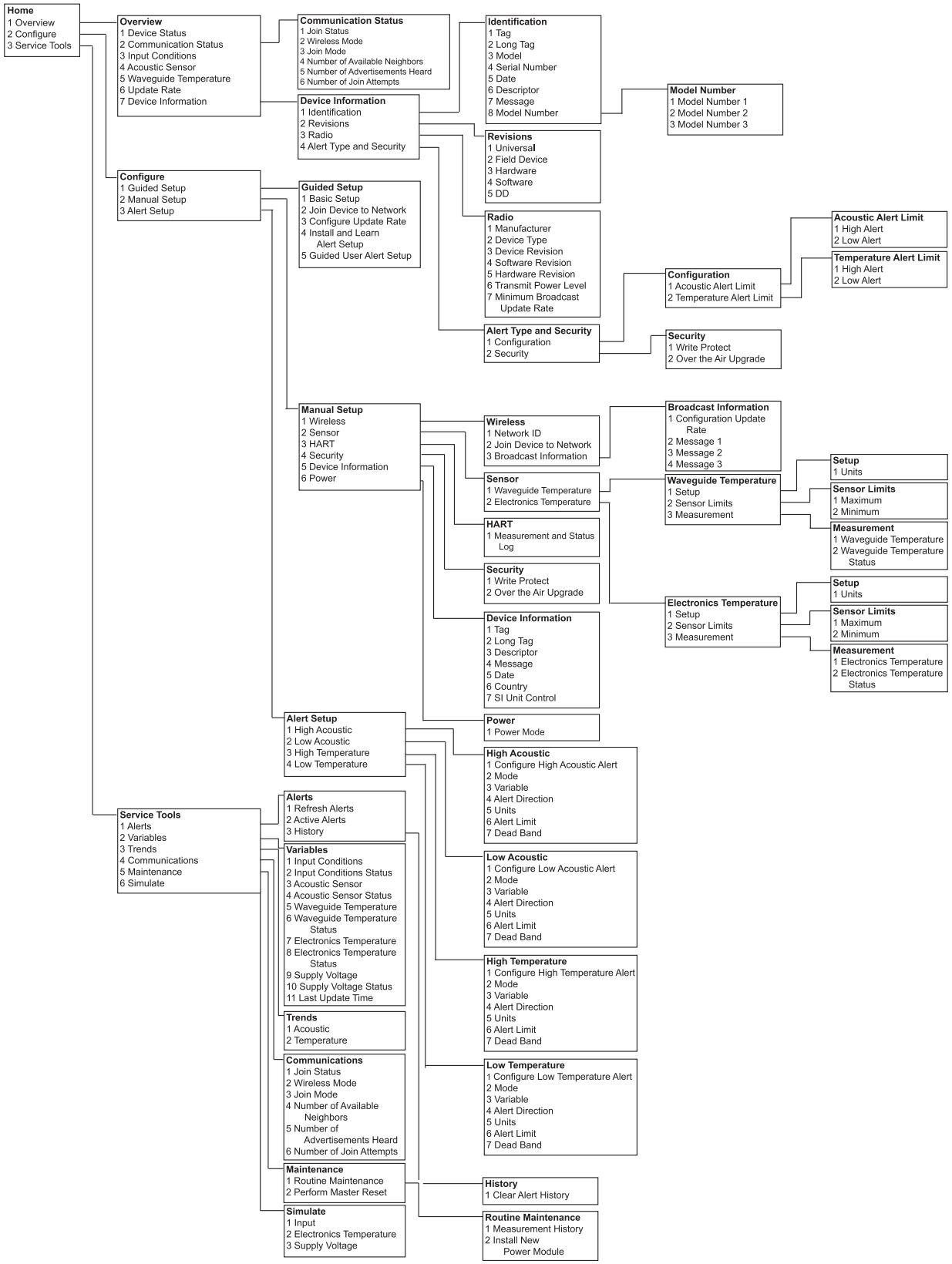
Function	Key Sequence	Menu Items
Device Information	2, 2, 5	Tag, Long Tag, Descriptor, Message, Date, Country, SI Unit Control
Guided Setup	2, 1	Basic Setup, Join Device to Network, Configure Update Rates, Alert Setup
Manual Setup	2, 2	Wireless, Sensor, HART, Security, Device Information, Power
Wireless	2, 2, 1	Network ID, Join Device to Network, Broadcast Information

REMOVE POWER MODULE

After the sensor and network have been configured, remove the power module and replace the power module cover. The power module should be inserted only when the device is ready for commissioning.

HART MENU TREE

Figure 2-2. Field Communicator Menu Tree



Section 3 Mounting

Safety Messages . . . . . page 3-1
Mounting . . . . . page 3-1

SAFETY MESSAGES

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Warnings

⚠WARNING

Failure to follow these installation guidelines could result in death or serious injury**:**

Only qualified personnel should perform the installation

Explosions could result in death or serious injury.

Before connecting a Field Communicator in an explosive atmosphere, make sure that the instruments are installed in accordance with intrinsically safe field wiring practices

Verify that the operating atmosphere of the transmitter is consistent with the appropriate hazardous locations certifications

This device complies with Part 15 of the FCC Rules. Operation is subject to the following conditions: This device may not cause harmful interference. This device must accept any interference received, including interference that may cause undesired operation.

This device must be installed to ensure a minimum antenna separation distance of 20 cm (8 in.) from all persons.

MOUNTING

1. Locate the 708 on a section of piping as close as possible to the equipment to be monitored. Align the waveguide of the transmitter as shown in Figure 3-1 and Figure 3-2.
2. The mounting location should be free of foreign matter and corrosion to ensure good contact between the piping and the waveguide.
3. Tighten each clamp to 10.2 N-m (90 in-lb). Trim the excess clamp band material to prevent unwanted acoustic noise.
4. If commissioning the device, install the Green Power Module (see Figure 3-3 on page 3-2).
5. Ensure that the Power Module cover is fully tightened to prevent moisture ingress. The lip of the polymer Power Module cover should be in contact with the surface of the polymer enclosure to ensure a proper seal. Do not over tighten.

Figure 3-1. Transmitter Alignment

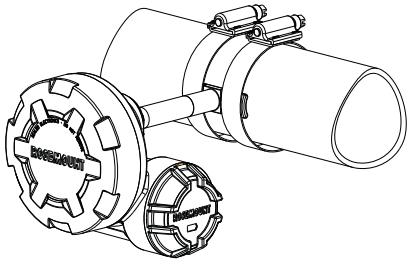


Figure 3-2. Transmitter Alignment Top View

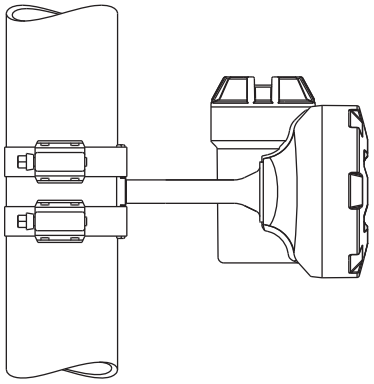
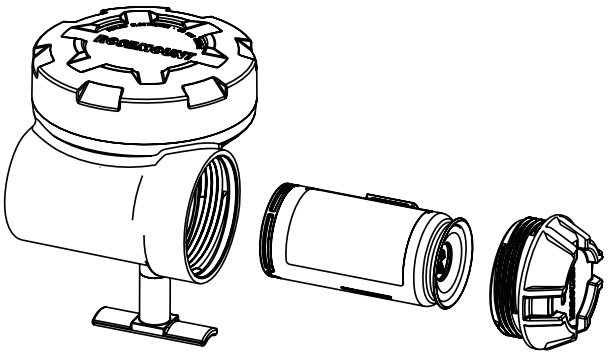


Figure 3-3. Power Module Installation

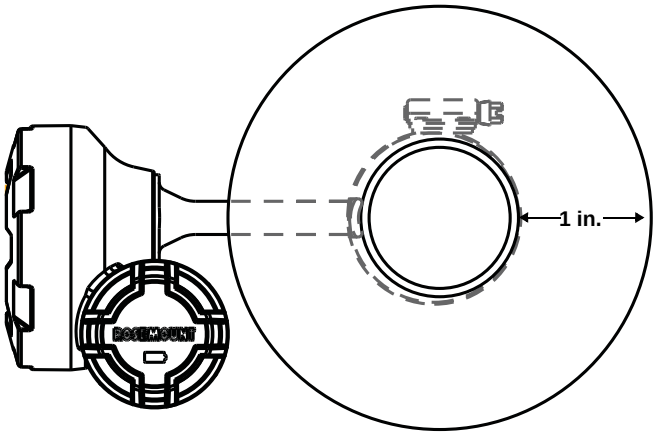


NOTE:
Wireless devices should be powered up in order of proximity from the Gateway, beginning with the closest device to the Gateway. This will result in faster network formation.

Mounting Considerations

1. Mounting bands should be inspected periodically and retightened if necessary. Some loosening may occur after initial installation due to thermal expansion/contraction.
2. The waveguide must be in direct contact with the pipe.
3. Insulate process piping to minimize ambient temperature effects (see Figure 3-4). Insulation thickness over the top of the waveguide foot should not exceed 2.54 cm (1-in).
4. For best results, mount the transmitter within 15.24 cm (6 in.) of the equipment to be monitored.
5. The stainless steel mounting bands could be affected by stress corrosion and potentially fail when in the presence of chlorides.
6. The transmitter should be installed such that steam or other high temperature fluids do not directly impinge the housing of the device.
7. If installing the device on a steam trap, the device should be installed on the upstream side of the trap.

Figure 3-4. Piping, Insulation Side View



Section 4 Commissioning

Safety Messages . . . . . page 4-1
Verify Operation . . . . . page 4-1

SAFETY MESSAGES

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Warnings

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Installation of this transmitter in an explosive environment must be in accordance with the appropriate local, national, and international standards, codes, and practices. Please review the Product Certifications section for any restrictions associated with a safe installation.

- Before connecting a Field Communicator in an explosive atmosphere, ensure the instruments are installed in accordance with intrinsically safe

NOTE
The Rosemount 708 and all other wireless devices should be installed only after the Gateway has been installed and is functioning properly.

Wireless devices should be powered up in order of proximity from the Gateway, beginning with the device closest to the Gateway. This will result in a simpler and faster network installation.

VERIFY OPERATION

There are three ways to verify operation: using the Field Communicator, using the Gateway's integrated web interface, or by using AMS® Suite Wireless Configurator or AMS Device Manager.

If the Rosemount 708 was configured with the Network ID and Join Key, and sufficient time has passed, the transmitter will be connected to the network. If Network ID and Join Key were not configured, please reference Troubleshooting on page 4-3.

NOTE
It may take several minutes for the device to join the network.

Field Communicator

For HART Wireless transmitter communication, a 708 DD is required. To obtain the latest DD, visit the Emerson Process Management Easy Upgrade site at: *http://www2.emersonprocess.com/en-US/documentation/deviceinstallkits*. The communication status may be verified in the wireless device using the following Fast Key sequence.

Function	Key Sequence	Menu Items
Communications	3, 4	Join Status, Wireless Mode, Join Mode, Number of Available Neighbors, Number of Advertisements Heard, Number of Join Attempts

Smart Wireless Gateway

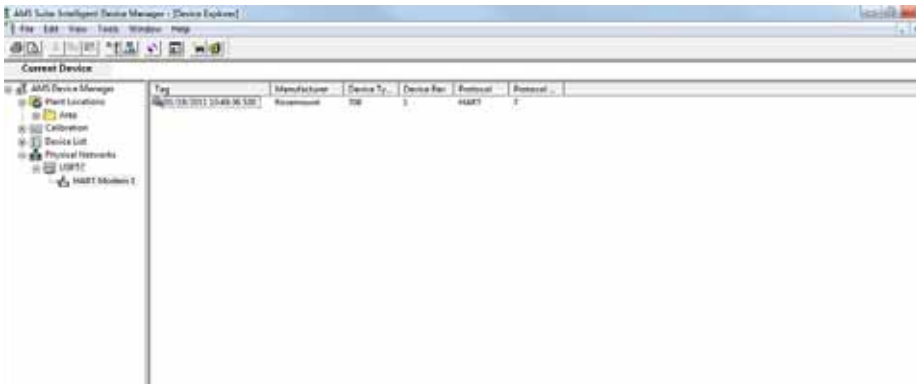
Using the Gateway's web interface, navigate to the Explorer page as shown in Figure 4-1. Locate the device in question and verify all status indicators are good (green).

Figure 4-1. Smart Wireless Gateway Explorer page

AMS® Suite Wireless Configurator

When the device has joined the network, it will appear in the Device Manager as illustrated in Figure 4-2. For HART Wireless transmitter communication, a 708 DD is required. To obtain the latest DD, visit the Emerson Process Management Easy Upgrade site at: *http://www2.emersonprocess.com/en-US/documentation/deviceinstallkits*.

Figure 4-2. Device Manager



NOTE
SteamLogic software is provided for viewing steam trap status. Refer to the manual on the CD for more information.

Troubleshooting

If the device is not joined to the network after power up, verify the correct configuration of the Network ID and Join Key, and that Active Advertising has been enabled on the Gateway. The Network ID and Join Key in the device must match the Network ID and Join Key of the Gateway.

The Network ID and Join Key may be obtained from the Gateway on the **Setup>Network>Settings** page of the web server (see Figure 4-3 on page 4-3). The Network ID and Join Key may be changed in the wireless device by following the Fast Key sequence shown below.

Function	Key Sequence	Menu Items
Join Device to Network	2, 1, 2	Network ID, Set Join Key

Figure 4-3. Smart Wireless Gateway Network Settings

Field Communicator Use

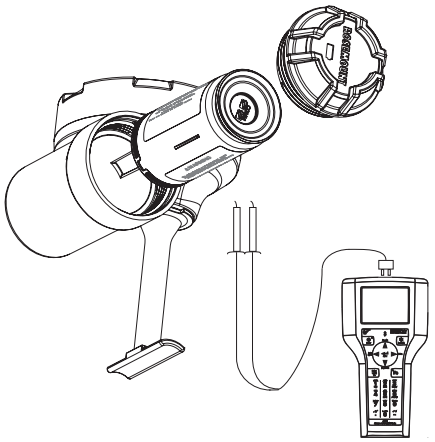
NOTE
In order to communicate with a Field Communicator, power the 708 by connecting the Power Module. For more information on the Power Module, refer to the Power Module product data sheet (Document No 00813-0100-4701).

Table 4-1 includes Fast Key sequences frequently used to interrogate and configure the device.

Table 4-1. 708 Fast Key Sequence

Function	Key Sequence	Menu Items
Device Information	2, 2, 5	Tag, Long Tag, Descriptor, Message, Date, Country, SI Unit Control
Guided Setup	2, 1	Basic Setup, Join Device to Network, Configure Update Rates, Alert Setup
Manual Setup	2, 2	Wireless, Sensor, HART, Security, Device Information, Power
Wireless	2, 2, 1	Network ID, Join Device to Network, Broadcast Information

Figure 4-4. Field Communicator Connections



Section 5 Operation and Maintenance

Safety Messages . . . . . page 5-1
Operation . . . . . page 5-1
Alerts . . . . . page 5-2
Power Module Replacement . . . . . page 5-5

SAFETY MESSAGES

Instructions and procedures in this section may require special precautions to ensure the safety of the personnel performing the operations. Information that potentially raises safety issues is indicated by a warning symbol (⚠). Please refer to the following safety messages before performing an operation preceded by this symbol.

Warnings

⚠WARNING

Failure to follow these installation guidelines could result in death or serious injury.

- Make sure only qualified personnel perform the installation.

Explosions could result in death or serious injury.

Installation of this transmitter in an explosive environment must be in accordance with the appropriate local, national, and international standards, codes, and practices. Please review the Product Certifications section for any restrictions associated with a safe installation.

- Before connecting a Field Communicator in an explosive atmosphere, ensure the instruments are installed in accordance with intrinsically safe

OPERATION

The Rosemount 708 senses acoustic energy and temperature of the waveguide. The acoustic energy is reported in 'counts,' which are a relative indication of the magnitude of the acoustic energy sensed. The acoustic sensor used in the Rosemount 708 is sensitive to a broad range of spectral frequencies in order to work in many different installations. The acoustic measurement or “count” in the Rosemount 708 is an average of the broad range of frequencies. No additional signal processing is performed to isolate specific frequencies.

This count information is used to determine the state of a steam trap, pressure relief valve, or other mechanical system. The device works similar to a discrete device, looking for a large change in noise level that is made during a leak or release. In the case of steam traps, SteamLogic software calculates the steam trap state based on the acoustic and temperature information published by the Rosemount 708. (Refer to SteamLogic manual for further information.)

In the case of other equipment, the Rosemount 708 may be configured with alerts to detect and communicate changes in the state of the system being monitored.

ALERTS

The Rosemount 708 can be configured to report alerts based on the acoustic and temperature level measured. The Rosemount 708 also reports diagnostic alerts when there is a device malfunction. For information on these alerts, refer to Section 6: Troubleshooting. The following figures show how the AMS Suite Intelligent Device Manager overview screen looks for each of the alert conditions.

Figure 5-1. AMS Device Manager Overview Screen, Normal Conditions

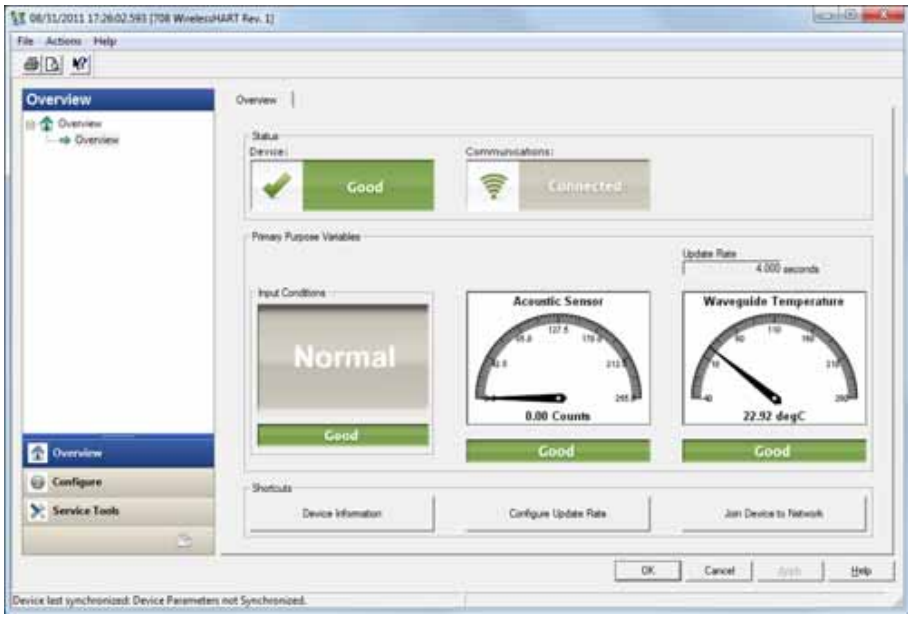
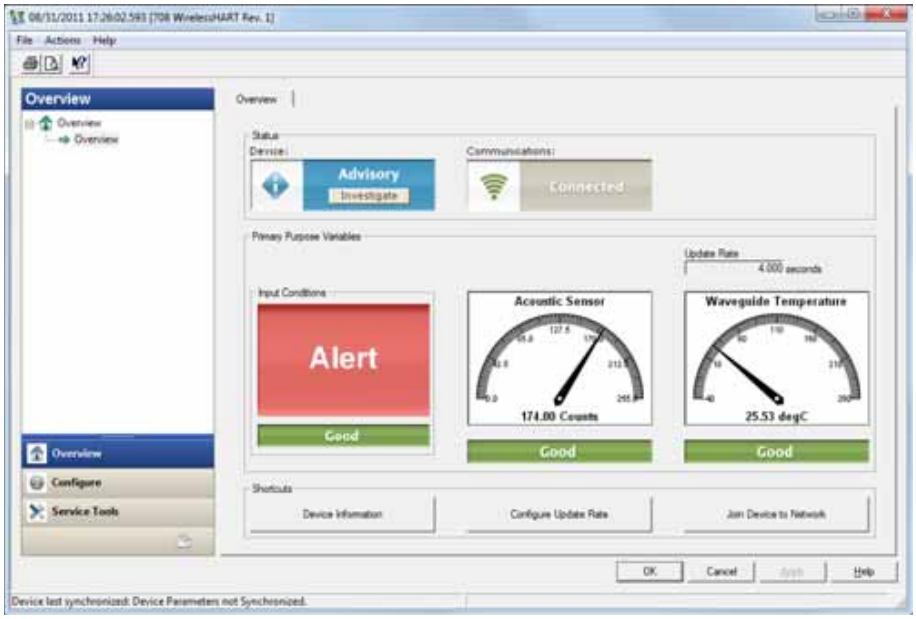


Figure 5-2. AMS Device Manager Overview Screen, Alert Conditions



Device Alert Configuration

Alert Levels

The Rosemount 708 provides 4 user configurable alerts.

Acoustic High - Triggers when acoustic level exceeds a user configured threshold.

Acoustic Low - Triggers when acoustic level falls below a user configured threshold.

Temperature High - Triggers when temperature level exceeds a user configured threshold.

Temperature Low - Triggers when temperature level falls below a user configured threshold.

Alert Setup

There are three methods that can be used to set up these alerts using AMS Wireless Configurator or a field communicator.

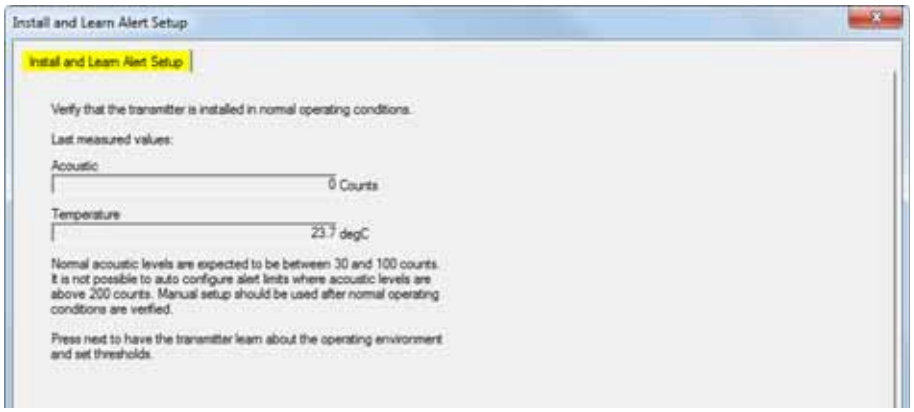
Figure 5-3. Alert Setup screen

Alert Setup - Install and Learn

To use the install and learn function on the device to setup the alerts the device must be installed and the equipment being monitored must be in its normal state. After installation and operating conditions have been confirmed, go to the configuration menu under guided setup and click on "**alert setup**." This will launch a dialog menu (Figure 5-3 on page 5-3), click on "**Install and Learn Alert Setup**." The application will then go through a series of steps that will determine the current input conditions and set alerts based on this normal operation (Figure 5-4).

If the input conditions are too close to the high or low measurement limits of the device, the install and learn function will not be a good method to set the alert levels. If this is the case, it is recommended that installation conditions be checked and that the status is verified before moving ahead. If current input conditions do not allow for the install and learn function, use the manual or guided alert setup to set alerts.

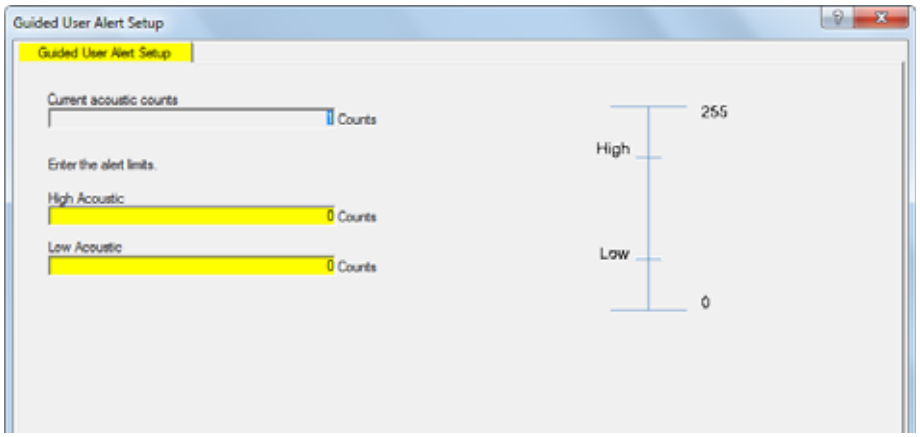
Figure 5-4. Install and Learn Alert Setup screen



Alert Setup - Guided User Alert Setup

Guided user alert setup cycles through on-screen prompts to set the alert levels. At each screen, the current level will be shown along with a box to enter the desired alert level as seen in Figure 5-5. To use the guided alert setup, navigate to the configuration menu under guided setup and click on **alert setup**. Click on "**Guided User Alert Setup**." Follow the on-screen prompts and enter the desired alert levels.

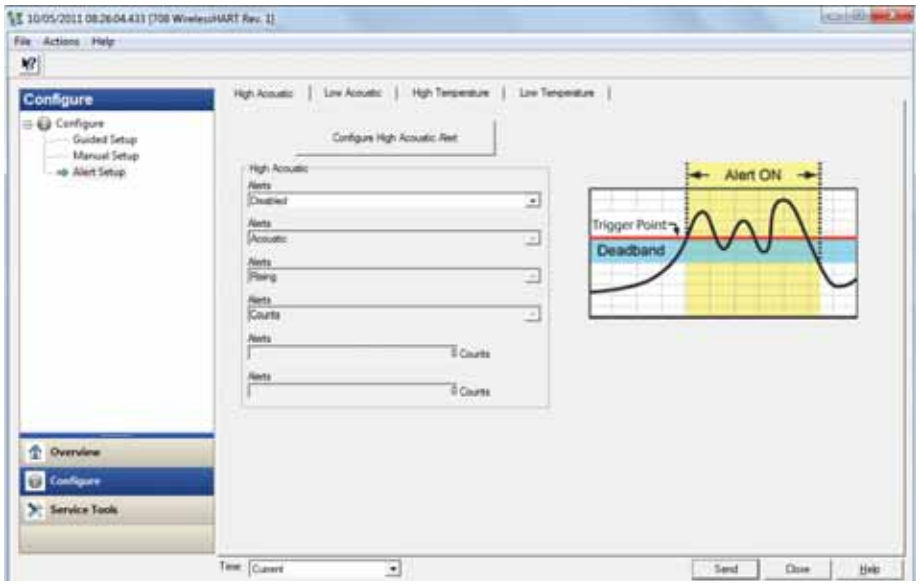
Figure 5-5. Guided User Alert Setup screen



Alert Setup - Manual

To manually set the alert levels, navigate to alerts the configuration menu and click on **Alert Setup** under the main configuration menu. Enter the desired alert levels for each alert as seen in Figure 5-6.

Figure 5-6. Manual Alert Setup screen



If a device is installed and shows an unexpected alert, verify the installation conditions.

POWER MODULE REPLACEMENT

Expected power module life is ten years at reference conditions.(1)

When the power module needs to be replaced, remove the power module cover and the power module (SmartPower Solutions™, model number 701PGN green power module) then replace the power module and the cover. Ensure that the power module cover is fully tightened to prevent moisture ingress. The lip of the polymer power module cover should be in contact with the surface of the polymer enclosure to ensure a proper seal. Do not over tighten.

Handling Considerations

The green power module contains one “D” size primary lithium/thionyl chloride battery. Each battery contains approximately 5.0 grams of lithium. Under normal conditions, the battery materials are self-contained and are not reactive as long as the batteries and the battery pack integrity are maintained. Care should be taken to prevent thermal, electrical or mechanical damage. Contacts should be protected to prevent premature discharge.

⚠ Use caution when handling the power module, it may be damaged if dropped from heights in excess of 6.1 meters (20 feet).

Battery hazards remain when cells are discharged.

Environmental Considerations

As with any battery, local environmental rules and regulations should be consulted for proper management of spent batteries. If no specific requirements exist, recycling through a qualified recycler is encouraged. Consult the materials safety data sheet for battery specific information.

(1) Reference conditions are 21 °C (70 °F), transmit rate of once per minute, and routing data for three additional network devices.

Shipping Considerations

The unit was shipped to you without the power module installed. Please remove the power module prior to shipping.

Each power module contains one “D” size primary lithium battery. Primary lithium batteries are regulated in transportation by the U.S. Department of Transportation, and are also covered by International Air Transport Association (IATA), International Civil Aviation Organization (ICAO), and European Ground Transportation of Dangerous Goods (ARD). It is the responsibility of the shipper to ensure compliance with these or any other local requirements. Please consult current regulations and requirements before shipping.

Section 6 Troubleshooting

Overview . . . . . page 6-1
Safety Messages . . . . . page 6-1

OVERVIEW

Table 6-1 provides summarized maintenance and troubleshooting suggestions for the most common operating problems.

If you suspect malfunction despite the absence of any diagnostic messages, follow the procedures described here to verify that transmitter hardware and process connections are in good working order. Always deal with the most likely checkpoints first.

SAFETY MESSAGES

Instructions and procedures in this section may require special precautions to ensure the safety of the personnel performing the operations. Information that potentially raises safety issues is indicated by a warning symbol (⚠). Please refer to the following safety messages before performing an operation preceded by this symbol.

Warnings

⚠WARNING

Failure to follow these installation guidelines could result in death or serious injury.

- Make sure only qualified personnel perform the installation.

Explosions could result in death or serious injury.

Installation of this transmitter in an explosive environment must be in accordance with the appropriate local, national, and international standards, codes, and practices. Please review the Product Certifications section for any restrictions associated with a safe installation.

- Before connecting a Field Communicator in an explosive atmosphere, ensure the instruments are installed in accordance with intrinsically safe

Table 6-1. Maintenance and Troubleshooting Suggestions

Symptom	Corrective Actions
Device Troubleshooting	
Electronics Failure	1. Reset the device. 2. Reconfirm all configuration items in the device. 3. If the condition persists, replace the device.
Acoustics Failure	1. Reset the device. 2. If the condition persists, replace the device.
WaveguideTemperature Failure	1. Reset the device. 2. If the condition persists, replace the device.
Radio Failure	1. Reset the device. 2. If the condition persists, replace the device.
Supply Voltage Failure	1. Replace the Power Module. 2. If the condition persists, replace the device.
Electronics Warning	1. Reset the device. 2. Reconfirm all configuration items in the device. 3. If the condition persists, replace the device.
Acoustics exceeded the limits	1. Check process for possible saturation condition. 2. Reset the device. 3. If the condition persists, replace the device.
Electronics Temperature exceeded the limits	1. Verify ambient temperature is within the transmitter's range. 2. Reset the device. 3. If the condition persists, replace the device.
Waveguide Temperature exceeded the limits	1. Verify process temperature is within the transmitter's range. 2. Reset the device. 3. If the condition persists, replace the device.
Supply Voltage Low	1. Replace the Power Module.
Database Memory Warning	1. Reset the device. 2. Reconfirm all configuration items in the device. 3. If logging dynamic data not needed, this advisory can be safely ignored.
High Acoustic Level	1. Verify process conditions. Correct if they are outside of normal operating conditions. 2. Verify proper alert configuration. Reconfigure if necessary.
Low Acoustic Level	1. Verify process conditions. Correct if they are outside of normal operating conditions. 2. Verify proper alert configuration. Reconfigure if necessary.
High Temperature Level	1. Verify process conditions. Correct if they are outside of normal operating conditions. 2. Verify proper alert configuration. Reconfigure if necessary.
Low Temperature Level	1. Verify process conditions. Correct if they are outside of normal operating conditions. 2. Verify proper alert configuration. Reconfigure if necessary.
Simulation Active	1. Verify that simulation is no longer required. 2. Disable Simulation mode in Service Tools. 3. Reset the device.
Short Battery Life	1. Check that "Power Always On" mode is off . 2. Verify device is not installed in extreme temperatures. 3. Verify that device is not a network pinch point.
Configuration Troubleshooting	
Cannot configure the device with 375 or AMS	1. Power cycle the device. 2. Verify/replace power module. 3. Refer to AMS and/or handheld configuration tool manual for further troubleshooting.
Wireless Troubleshooting	
Poor wireless connectivity	1. Verify device oriented for optimal connections (See Section 1 of this document). 2. Verify wireless network best practices are followed (See Appendix C for more information).
Acoustic Transmitter not joining network	1. Verify the device has power. 2. Verify the device is within effective communications range. 3. Verify the proper Network ID has been entered into the device. 4. See troubleshooting section of the Smart Wireless Gateway for more information (Document No. 00808-0200-4420).
Limited Bandwidth Error	1. Use the slowest acceptable update Rate. 2. Increase communication paths by adding more wireless points. 3. Check that the device has been online for at least an hour. 4. Create a new network with an additional Smart Wireless Gateway.

Appendix A Specifications and Reference Data

Specifications . . . . . page A-1
Dimensional Drawings . . . . . page A-3
Ordering Information . . . . . page A-4

SPECIFICATIONS

Functional Specifications

Output
IEC 62591 (WirelessHART) 2.4 GHz DSSS

Humidity Limits
0–100% relative humidity

Transmit Rate
User selectable 1 second to 60 minutes

Radio Frequency Power Output from Antenna
Internal (WP option) antenna: Maximum of 10 mW (10 dBm) EIRP

Physical Specifications

Electrical Connections/Power Module

- Replaceable, non-rechargeable, Intrinsically Safe Lithium-Thionyl Chloride power module pack with PBT/PC enclosure
- Ten year power module life at reference conditions(1)

Field Communicator Connections
Communication Terminals - Clips permanently fixed to power module

Materials of Construction

Housing
PBT/PC

Cover O-ring
Silicone

Power Module Housing
PBT/PC

Wave Guide
Machined 316L SST

Mounting
Transmitters are directly attached to process piping using two stainless steel mounting bands.

(1) Reference conditions are 21 °C (70 °F), transmit rate of once per minute, and routing data for three additional network devices.

Weight
708 with power module -0.595 kg (1.31 lb)
708 without power module - 0.445 kg (0.98 lb)

Enclosure ratings
NEMA 4X and IP66/67

Performance Specifications

Vibration Effect
Tested per the requirements of IEC60770-1 field or pipeline with high vibration level (10-60 Hz 0.21 mm displacement peak amplitude/60-2000 Hz 3g).

Temperature Limits
Ambient Limit -40 °C to 85 °C (-40 °F to 185 °F)
Storage Limit -40 °C to 85 °C (-40 °F to 185 °F)

Temperature Derating

Process Temperature (°C)	Max Ambient (°C)
260	41
240	45
220	49
200	53
180	57
160	61
140	64
120	68
100	72
85	75

ElectroMagnetic Compatibility (EMC)

All Models:
Meets all relevant requirements of EN 61326-2-3:2006

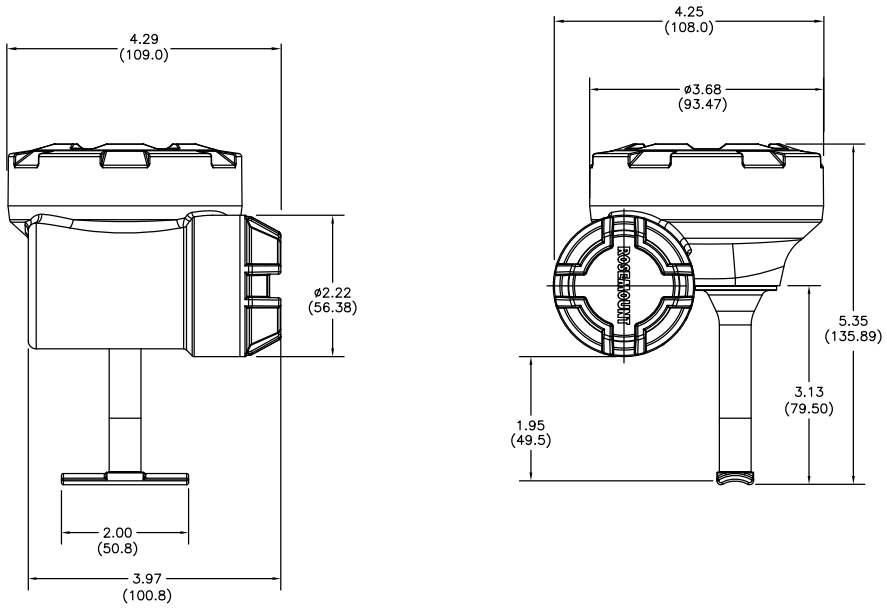
Wireless Output Specifications

Acoustic Level
0-255 counts

Temperature
-40 to 260 °C (-40 to 500 °F)

DIMENSIONAL DRAWINGS

Rosemount 708 Direct Mount



Dimensions are in inches (millimeters)

ORDERING INFORMATION

Table A-1. Rosemount 708 Acoustic Transmitter Ordering Information

★ The Standard offering represents the most common options. The starred options (★) should be selected for best delivery. The Expanded offering is subject to additional delivery lead time.

Model	Product Description	
Standard		**Standard**
708	Acoustic Transmitter	★
Output Protocol		
Standard		**Standard**
X	Wireless	★
Measurement		
Standard		**Standard**
1	Steam Traps with SteamLogic software	★
2	Other Measurements	★
Housing		
Standard		**Standard**
P	Engineered Polymer	★
Waveguide Configuration		
Standard		**Standard**
A1	Acoustic Waveguide	★
Product Certifications		
Standard		**Standard**
NA	No Hazardous Location Approval	★
I1	ATEX Intrinsic Safety	★
I2	INMETRO Intrinsic Safety	★
I5	FM Intrinsically Safe	★
I6	CSA Intrinsically Safe	★
I7	IECEx Intrinsic Safety	★
Mounting Hardware		
Standard		**Standard**
NA00	No Mounting Hardware	★
HC01	Stainless Steel Mounting Band, Pipe size $^{1}/_{2}$ to 2-$^{1}/_{2}$-in.	★
HC02	Stainless Steel Mounting Band, Pipe size 3-in. to 4-in.	★
HC03	Stainless Steel Mounting Band, Pipe size 4-in. to 10-in.	★

Wireless Options (Include with selected model number)

Wireless Update Rate, Operating Frequency and Protocol		
Standard		**Standard**
WA3	User Configurable Update Rate, 2.4 GHz DSSS, IEC 62591 (WirelessHART)	★
Omnidirectional Wireless Antenna and SmartPower Solutions		
Standard		**Standard**
WP5(1)	Internal Antenna, Compatible with Green Power Module (I.S. Power Module Sold Separately)	★
Configuration		
Standard		**Standard**
C1	Factory Configure Date, Descriptor, Message Fields and Wireless Parameters	★
Typical Model Number: 708 X 1 P A1 NA HC01 WA3 WP5		

(1) Power module must be shipped separately, order 701PGNKF.

Appendix B Product Certifications

Approved Manufacturing Locations . . . . . page B-1
Telecommunication Compliance . . . . . page B-1
FCC and IC . . . . . page B-1
European Union Directive Information . . . . . page B-1
Ordinary Location Certification for FM . . . . . page B-1
Hazardous Locations Certificates . . . . . page B-2

Approved Manufacturing Locations

Rosemount Inc. - Chanhassen, Minnesota, USA
Emerson Process Management GmbH & Co. - Karlstein, Germany
Emerson Process Management Asia Pacific Private Limited - Singapore

Telecommunication Compliance

All wireless devices require certification to ensure that they adhere to regulations regarding the use of the RF spectrum. Nearly every country requires this type of product certification. Emerson is working with governmental agencies around the world to supply fully compliant products and remove the rise of violating country directives or laws governing wireless device usage.

FCC and IC

This device complies with Part 15 of the FCC Rules. Operation is subject to the following conditions: This device may not cause harmful interference. This device must accept any interference received, including interference that may cause undesired operation.

This device must be installed to ensure a minimum antenna separation distance of 20 cm from all persons.

European Union Directive Information

The EC Declaration of Conformity for all applicable European directives for this product can be found on www.rosemount.com. A hard copy may be obtained by contacting your local sales representative.

ATEX Directive (94/9/EC)
Emerson Process Management complies with the ATEX Directive.

Electro Magnetic Compatibility (EMC) (2004/108/EEC)
EN 61326-1; 2006
EN 61326-2-3; 2006

Radio and Telecommunications Terminal Equipment Directive (R & TTE) (1999/5/EC)
Emerson Process Management complies with the R&TTE Directive.

Ordinary Location Certification for FM

As standard, the transmitter has been examined and tested to determine that the design meets basic electrical, mechanical, and fire protection requirements by FM Approvals, a nationally recognized testing laboratory (NRTL) as accredited by the Federal Occupational Safety and Health Administration (OSHA).

Hazardous Locations Certificates

North American Certifications

Factory Mutual (FM) Approvals

I5 Intrinsically Safe
Intrinsically Safe for Class I, Division 1, Groups A, B, C, and D
Zone Marking: Class I, Zone 0, AEx ia IIC
Temperature Codes T4 (T_{amb} = -40 to 70 °C)
Ambient temperature limits: -40 to 70 °C
For use with SmartPower Solutions, model number 701PGN green power module only.
Enclosure Type 4X / IP66/67

Special Conditions for Safe Use (X):

1. The Rosemount 708 Wireless Acoustic Transmitter shall only be used with the SmartPower Solutions, model number 701PGN green power module.
2. Potential Electrostatic charging Hazard – See Instructions.

Standards:

FM3600:1998
FM3610:2010
ANSI/NEMA 250
ANSI/IEC60529:2004

CSA International

I6 CSA Intrinsically Safe
Certificate No: 2439890
Applicable Standards: CSA std. C22.2 no. 142-M1987, CSA Std. C22.2 No. 157-92
Intrinsically Safe for Class I, Division 1, Groups A, B, C, and D
T3C (-40 °C ≤ T_{amb} ≤ 70 °C)
Intrinsically safe when installed according to Rosemount Drawing 00708-1001
For use with SmartPower Solutions, model number 701PGN green power module only.
Enclosure Type 4X, IP66/67

European Certifications

I1 ATEX Intrinsic Safety
Certificate No.: BASEEFA11ATEX0174X ⟨Ex⟩ II 1G
Ex ia IIC T4 (T_a = -40 °C ≤ T_{amb} ≤ 70 °C)
IP66/67
For use with SmartPower Solutions, model number 701PGN green power module only.

CE 1180

Special Conditions for Safe Use (X):

1. The engineered polymer enclosure of the Rosemount 708 may constitute a potential electrostatic ignition risk and must not be rubbed or cleaned with a dry cloth.

Standards:

EN60079-0:2009
EN60079-11:2007

IECEx System Certifications

I7 IECEx Intrinsic Safety
Certificate No.: IECExBAS 11.0091X
Ex ia IIC G_a (T_a = -40 °C ≤ T_{amb} ≤ 70 °C)
IP66/67
For use with SmartPower Solutions, model number 701PGN green power module only.

CE 1180

Special Conditions for Safe Use (X):

1. The engineered polymer enclosure of the Rosemount 708 may constitute a potential electrostatic ignition risk and must not be rubbed or cleaned with a dry cloth.

Standards:

EC60079-0:2007-10

IEC60079-11:2006

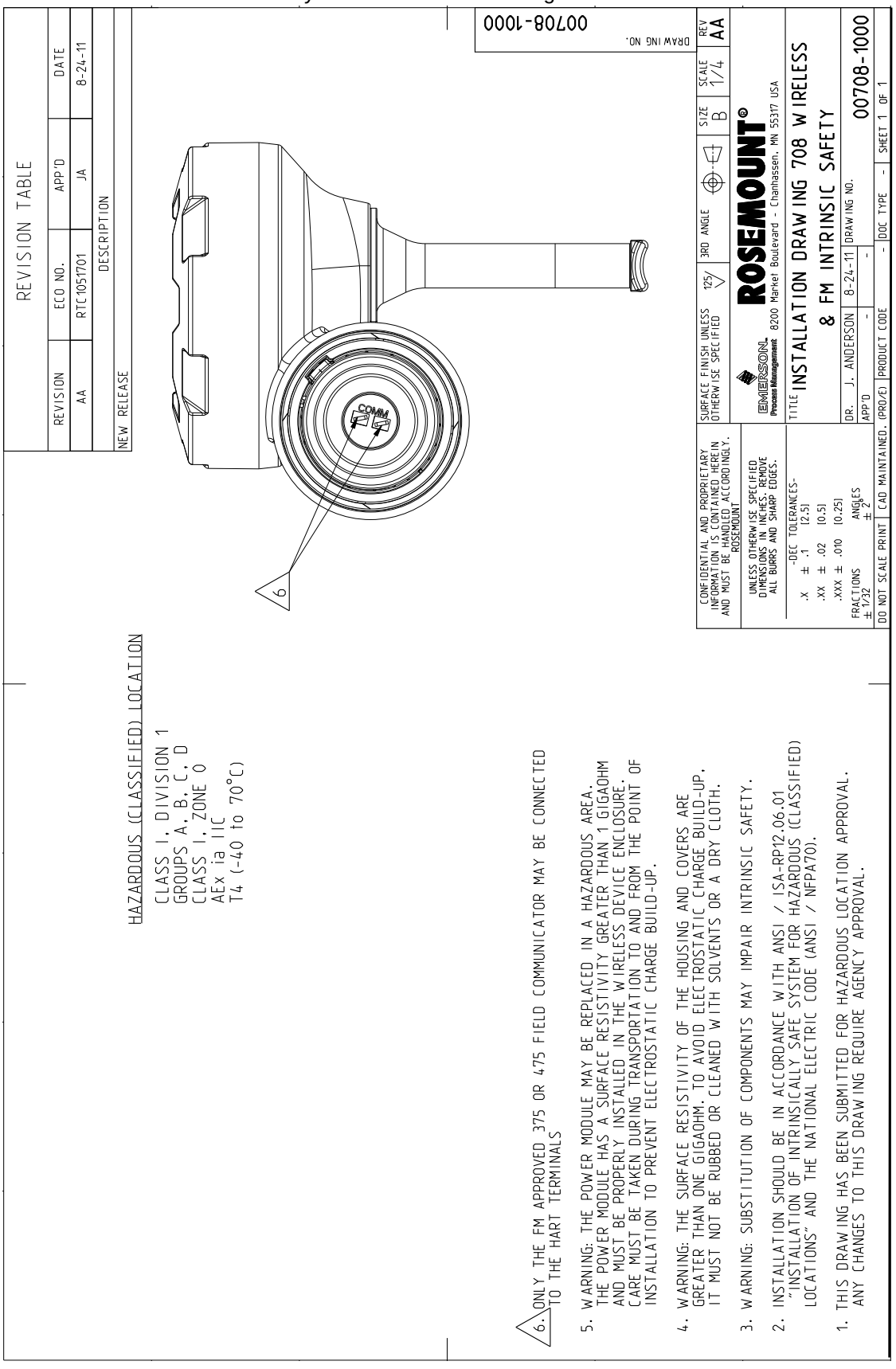
Brazilian Certifications

I2 Certificate No.: NCC 12.0817X
INMETRO marking: Ex ia IIC T4 Ga
Electric parameters: Un=3,9Vcc /In=2,313A /
Pn=2,255W / Co=0 /Lo=0

Safe Use Conditions (X):

The enclosure may constitute a potential electrostatic ignition risk and must not be rubbed or cleaned with dry cloth.

Figure B-1. Rosemount 708 FM Intrinsically Safe Installation Drawing



Appendix C Recommended Practices

Effective Range . . . . . page C-1

All recommended practices should be followed to ensure highest data reliability. Deviation from those best practices may require device repeaters in the network to maintain 99% data reliability. The following are guidelines to achieve the best possible Smart Wireless Network.

1. Each wireless network field should be scoped to a single process unit.
2. Minimize the number of hops to the Gateway in order to reduce latency. Contain a minimum of five wireless instruments within effective range of the Smart Wireless Gateway.
3. Have at minimum three devices with potential communication paths. For stronger performance, increase the required number of wireless neighbor devices to four or five. This increases the number of potential paths and thus optimized network performance.
4. Have 25 percent of wireless instruments in the network within range of Smart Wireless Gateway. Other enhancing modifications include creating a higher percentage of devices within effective range of the gateway to 35 percent or more. This clusters more devices around the gateway and ensures fewer hops and more bandwidth available to *Wireless*HART devices with fast scan rates.
5. Keep path distance from Gateway to a minimum. For better performance, the path typically is within range of one to two hops. This will utilize path redundancy and create very short transit times.
6. Effective range is determined by type of process unit and the density of the infrastructure that surrounds the network.

EFFECTIVE RANGE

Heavy Obstruction: 100 ft. (30 m). Typical heavy density plant environment. Cannot drive a truck or equipment through.

Medium Obstruction: 250 ft. (76 m). Typical light process areas, lots of space between equipment and infrastructure.

Light Obstruction: 500 ft. (152 m). Typical of tank farms. Despite tanks being big obstructions themselves, lots of space between and above makes for good RF propagation.

Line of Sight: 750 ft. (230 m). No obstructions between *Wireless*HART devices and devices mounted a minimum of 6 ft. (2 m) above ground or obstructions.

For examples and complete explanations, refer to the IEC62591 *Wireless*HART System Engineering Guide:

http://www2.emersonprocess.com/siteadmincenter/PM%20Central%20Web%20Documents/EMR_WirelessHART_SysEngGuide.pdf

Reference Manual
00809-0100-4708, Rev AC
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00809-0100-4708 Rev AD, 9/12

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